

**Claims:**

1. An apparatus for vacuum treating two-dimensionally extended substrates comprising
  - (a) a vacuum transport chamber with a transport robot  
5 arrangement;
  - (b) a processing arrangement with at least one processing station communicating by at least one workpiece pass-through opening with said vacuum transport chamber;
  - (c) a loadlock arrangement communicating by at least one  
10 workpiece pass-through opening with said vacuum transport chamber and by at least one further workpiece pass-through opening with an atmosphere outside said vacuum transport chamber and said processing arrangement;
  - 15 (d<sub>1</sub>) one single loadlock- and processing tower formed by said processing arrangement and said loadlock arrangement arranged vertically one upon the other.
2. an apparatus according to the features (a), (b) and (c) of claim 1, further comprising
  - 20 (d<sub>2</sub>) at least two loadlock- and processing towers, each formed by one loadlock arrangement and one processing arrangement.
3. The apparatus of claim 1 or 2, wherein said transport robot comprises at least one substantially horizontal  
25 substrate support for at least one substrate, said substrate support being driven and controllably movable in vertical direction as well as in horizontal direction into

alignment with said openings and into and from said at least one loadlock- and processing tower.

4. The apparatus of claim 3, wherein said substrate support is additionally rotatable about a vertical axis in  
5 a controllably driven manner.

5. The apparatus of claim 4, wherein said rotational movement is limited to at most 180°.

6. The apparatus of claim 5, wherein said rotational movement is limited to at most 45°.

10 7. The apparatus of claim 1 or 2, wherein said transport robot comprises at least one horizontal substrate support for at least one substrate which support is driven exclusively in vertical and in horizontal direction, in a respectively controlled manner.

15 8. The apparatus of one of claims 1 or 2, wherein at least one of said processing arrangements comprises at least one substrate-batch processing module.

9. The apparatus of one of claims 1 or 2, wherein at least one of said processing arrangements comprises at  
20 least one single substrate processing module.

10. The apparatus of one of claims 1 or 2, wherein at least one of said loadlock arrangements comprises an input/output loadlock arrangement.

11. The apparatus of claim 10, wherein said input/output  
25 loadlock arrangement comprises at least one single substrate input loadlock chamber.

12. The apparatus of claim 10, wherein said input/output loadlock arrangement comprises at least one single substrate output loadlock chamber.
13. The apparatus of claim 10, wherein said input/output  
5 loadlock arrangement comprises at least one of a substrate batch input loadlock chamber, of a substrate batch output loadlock chamber and of an input/output substrate batch loadlock chamber.
14. The apparatus of claim 2, wherein one of said loadlock  
10 and processing towers comprises one of an input and of an output loadlock arrangement.
15. The apparatus of claim 2, wherein exclusively two of said loadlock and processing towers are provided arranged on opposite sides of said transport vacuum chamber and  
15 facing each other.
16. The apparatus of claim 2, wherein exclusively two of said loadlock and processing towers are provided arranged one aside the other on one side of said vacuum transport chamber, said tower and said vacuum transport chamber  
20 concomitantly defining for a U-shaped footprint.
17. The apparatus of claim 2, wherein exclusively two of said loadlock- and processing towers are provided with said vacuum transport chamber defining concomitantly a Y-shaped footprint.
- 25 18. The apparatus of claim 1 or 2, wherein said substrate has an extent of at least  $1\text{m}^2$ , preferably of at least  $2\text{m}^2$  and even preferably of at least  $4\text{m}^2$ .

19. The apparatus of claim 1 or 2, wherein said loadlock arrangement comprises at least one of a treating and of a coating arrangement for at least one substrate.

20. A method for manufacturing two-dimensionally extended  
5 vacuum treated substrates comprising the steps of

- introducing at least one horizontal substrate horizontally into a loadlock chamber;
- transporting said at least one horizontal substrate from said loadlock chamber horizontally into a vacuum  
10 transport chamber;
- controllably moving said horizontal substrate vertically up or down;
- horizontally introducing said horizontal substrate into a processing chamber;
- 15 • treating said horizontal substrate in said processing chamber;
- horizontally removing said treated horizontal substrate from said processing station and back into said vacuum transport chamber;
- 20 • vertically transporting said horizontal substrate upwards or downwards within said transport chamber;
- horizontally transporting said treated horizontal substrate from said transport chamber into loadlock chamber;
- 25 • removing said treated horizontal substrate horizontally from said loadlock chamber.

21. The method of claim 20, thereby moving said substrate exclusively linearly.

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